

JP 05-192,224

---

Job No.: 1505-102351

Ref.: JP05192224A

Translated from Japanese by the Ralph McElroy Translation Company  
910 West Avenue, Austin, Texas 78701 USA

JAPANESE PATENT OFFICE  
PATENT JOURNAL (A)  
KOKAI PATENT APPLICATION NO. HEI 5[1993]-192224

Int. Cl. <sup>5</sup> :	A 45 D 34/04 A 61 K 7/00 B 05 B 5/025
Sequence Nos. for Office Use:	9165-4C 9153-4D
Filing No.:	Hei 4[1992]-188082
Filing Date:	July 15, 1992
Publication Date:	August 3, 1993
Priority	
Date:	July 15, 1991
Country:	Great Britain
No.:	9115278.5
No. of Claims:	27 (Total of 7 pages)
Examination Request:	Not filed

DISCHARGE SYSTEM FOR COSMETICS

Inventors:	Philip John Barnett 9 Moorside Ave., Park Gate, South Wirral L 64-6 QS, Great Britain
	Michael Richard Lowry 46 Saint Peters Way, Mickle Trafford, Near Chester CH 24 EJ, Great Britain
Applicant:	590003065 Unilever Naamloze Vennootschap 455 Weena, Rotterdam, Netherlands
Agents:	Yoshio Kawaguchi, patent attorney, and 3 others

[There are no amendments to this patent.]

### Abstract

#### Constitution

A device for discharging an effective and cosmetically active substance such as perfume by an electrostatic spray. A case 2 is equipped with various elements of an electrostatic spray system, and as the main elements, power source 12, high-voltage generator 14, additional circuit mechanisms 16a and 16b, operation adjustment means 20, storage unit 4, substance 6 to be sprayed, and discharge means 8 are included. The substance 6 is sprayed from a tip 9 of the discharge means 8.

#### Effect

The active substance can be sprayed at a very low speed, preferably in a pure or essentially pure form.

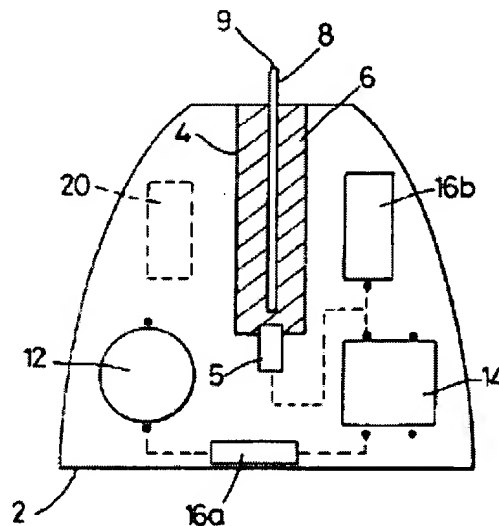


Fig. 1

### Claims

1. A method for discharging a substance on the body, characterized by the fact that an effective and cosmetically active substance is electrostatically sprayed on the body.
2. The method of Claim 1, characterized by the fact that (a) it is provided with a device consisting of (i) a storage unit that includes an effective and cosmetically active substance to be

discharged in electrostatically sprayable form, (ii) at least one discharge means connected to said storage unit, (iii) a high-voltage generator having a mechanical power source, and (iv) an adjustment means that selectively applies a high voltage obtained from the generator to one or more discharge means; and (b) the effective and cosmetically active substance is electrostatically sprayed on the desired area of the body from one or more discharge means by operating said adjustment means.

3. The method of Claim 1, characterized by the fact that the effective and cosmetically active substance is pure or essentially pure.

4. The method of any of Claims 1-3, characterized by the fact that the effective and cosmetically active substance is selected from perfume, local therapeutic substances, skin spot treating agents, wart removers, antiplaque agent, and their mixtures.

5. The method of any of Claims 1-4, characterized by the fact that the effective and cosmetically active substance is a composition containing less than 5 wt% of substances other than those listed above.

6. The method of Claim 5, characterized by the fact that said composition contains less than 1 wt% of substances other than the effective and cosmetic active substance.

7. The method of any of Claims 1-6, characterized by the fact that the rate of discharge of the effective and cosmetically active substance is 0.00001-0.01 mL/sec.

8. The method of any of Claims 1-7, characterized by the fact that the high-voltage generator of the device generates a voltage of 2-12 kV.

9. The method of any of Claims 1-8, characterized by the fact that a dose adjustment means for limiting the amount of effective and cosmetically active substance discharged is provided.

10. A device for discharging an effective and cosmetically active substance to the body, characterized by including (a) a storage unit that includes an effective and cosmetically active substance in electrostatically sprayable form; (b) at least one discharge means connected to said storage unit; (c) a high-voltage generator having a mechanical power source; and (d) an adjustment means that selectively applies a high voltage obtained from the generator to one or more discharge means and electrostatically sprays the effective and cosmetically active substance discharged from one or more discharge means.

11. The device of Claim 10, characterized by further inclusion of a dose adjustment means that limits the amount of effective and cosmetically active substance discharged.

12. The device of Claim 11, characterized by the inclusion in the dose adjustment means a time adjustment means that operates the adjustment means for only a preset time and/or a measurement means that discharges a preset amount of effective and cosmetically active substance.

13. The device of any of Claims 10-12, characterized by inclusion of a substance supply means between the storage unit and the one or more discharge means.

14. The device of Claim 13, characterized by the fact that the above-mentioned supply means is a wick.

15. The device of any of Claims 10-14, characterized by the fact that the high-voltage generator generates a voltage of 2-12 kV.

16. A device for discharging an effective and cosmetically active substance, characterized including (a) a case; (b) a storage unit present in the case that contains an effective and cosmetically active substance in electrostatically sprayable form; (c) at least one nozzle connected to the storage unit via a wick that supplies the effective and cosmetically active substance to the nozzle or each nozzle from the storage unit; (d) a high-voltage generator present in the case that has a mechanical power source, and (e) an adjustment means that selectively applies a high voltage obtained from the generator to one or more nozzles and electrostatically sprays the effective and cosmetically active substance discharged from one or more nozzles.

17. A combination, characterized by consisting of the device of any of Claims 10-16 and an electrostatically spraying composition that is composed of one or more effective and cosmetically active substances or essentially one or more effective and cosmetically active substances or includes one or more effective and cosmetically active substances.

18. The combination of Claim 17, characterized by the fact that the one or more effective and cosmetically active substances are selected from perfume, local therapeutic substance, skin spot treating agent, wart remover, and antiplaque agent.

19. An electrostatically sprayable composition, characterized by being composed of one or more effective and cosmetically active substances or essentially one or more effective and cosmetically active substances or containing one or more effective and cosmetically active substances.

20. The composition of Claim 19, characterized by the fact that the one or more effective and cosmetically active substances are pure or essentially pure.

21. The composition of Claim 19 or 20, characterized by the fact that the one or more effective and cosmetically active substances are selected from perfume, local therapeutic substance, skin spot treating agent, wart remover, and antiplaque agent.

22. The composition of any of Claims 19-21, characterized by the fact that the resistivity is  $10^4$ - $10^{12}$  ohm·cm.

23. The composition of any of Claims 18-22, characterized by the fact that along with the one or more effective and cosmetically active substances, less than 5 wt% of substances other than said substances are included.

24. The composition of Claim 23, characterized by the fact that substances other than the one or more effective and cosmetically active substances are included at less than 1 wt%.

25. The composition of any of Claims 18-24, characterized by the fact that a resistivity adjustor and/or a viscosity adjustor are further included.

26. Application of an electrostatic spray for discharging an effective and cosmetically active substance to the body.

27. The application of Claim 26, characterized by the fact that the device of any of Claims 10-16 is used.

#### Detailed explanation of the invention

[0001]

The present invention pertains to a system for discharging a cosmetically active substance to the body. In particular, the present invention pertains to a method and a device that apply said substance to the body by means of an electrostatic spray. The present invention is useful especially for the discharge of an effective and cosmetically active substance that requires a minimum amount of discharge.

[0002]

Conventional systems that apply effective and cosmetically active substances such as perfume on the body, especially the skin, depend on the dilution of a solvent and discharge these active substances at a sufficiently low concentration. However, the existence of the solvent may limit the effectiveness of the active substances by physical and/or chemical interactions, especially during storage, which limits the range of cosmetically active substances that can be discharged by these well known systems.

[0003]

For example, a perfume is discharged in solution form in which a perfume activator is dissolved in an appropriate solvent such as an alcohol from a pressurized vessel, however such a discharge system is ineffective, bulky, heavy, and expensive. Furthermore, since the problems of these well known conventional systems are accompanied by noise during use, the perceptual attraction is deficient, that is, the spray being generated is cold and humid, and the actuator is exposed to the air, causing a considerable waste. As a result, an undesirable spray is generated in the air that contaminates the eyes of that user and other parts of the body, so that a respiratory problem or another health problem may be caused. These are problems especially for small stores and departments where many perfume sprays are often tested by potential customers and considerable air pollution and waste are generated. Also, the use of aerosol propellants, which

typically are volatile organic compounds, is a current environmental problem, and it is recognized that they are likely harmful to the health. In fact, they are legally prohibited in many countries.

[0004]

The principle of electrostatic spraying of liquid and solid substances is known in considerably different technical fields. In these technical fields, compositions sprayed by a spray nozzle have an increased electric potential, and the composition is sprayed as small charged drops. Since these small charged drops seek the closest grounded object to discharge their electric charges, they can be used as desired spray targets. The conventional electrostatic spray method has been proposed mainly for large-scale industrial and agricultural applications, especially, the discharge of reactive substances such as paints, adhesives, and other surface coatings and the large-scale discharge of insecticides and other agricultural chemicals. These fields are presented in GB-A-1393333, GB-A-1569707, GB-A-2092025, EP-A-029301, EP-A-253539, and WO-A-85/00761.

[0005]

Very recently, some proposals have been made regarding the discharge of specific substances in specific usages other than the above-mentioned usages by utilizing the well known principle of electrostatic spraying.

[0006]

In EP-A-224353, it is suggested that instead of conventional eye treatments using ophthalmic solutions, pharmaceutically active reagents are discharged to the eyes by using an electrostatic sprayer.

[0007]

In JP-A-56-97214 (1981), it is suggested that a granular (that is, solid particle) dyeing substance be spread on the hair using an electrostatic spray and the surface is coated.

[0008]

Also, US4776515 proposes the adoption of an electrodynamic apparatus for generating negatively charged fine particles for the spraying of various liquids, especially aqueous solutions (alcohols, perfumes, ammonias, liquid drugs, and surfactants can also be used), although this is not much related. The purpose of the present system is to provide an ozone-free spray of negatively charged liquid particles (it is assumed that the substance to be sprayed can be

charged), and the spray generated is immediately dispersed into an open place where the device is operated, for example, a room, so that a uniform aerosol is generated. This system is applicable to public places such as hospitals, restaurants, and offices. This system is apparently inappropriate for small-scale personal use, and its purpose basically conflicts with the principle that seeks to solve the above-mentioned problems of the prior art.

[0009]

Accordingly, these inventors confirmed and understood the above-mentioned problems, preconceptions, and limits and researched a system that could discharge effective and cosmetically active substances such as perfume to the body by effectively using the electrostatic spraying principle through many experiments. As a result, a discharge type device and its method that are effective in terms of technique, cost effectiveness, and safety, and attractive to a broad range of consumers are provided. This system solves most of the problems of the prior art or at least improves upon them.

[0010]

Therefore, a first invention provides a method for discharging a substance on the body, and in said method, said substance is electrostatically sprayed on the body.

[0011]

More specifically, according to the method of the present invention, preferably, (a) a device consisting of (i) a storage unit that contains an effective and cosmetically active substance to be discharged in electrostatically sprayable form, (ii) at least one discharge means connected to said storage unit, (iii) a high voltage generator having a mechanical power source, and (iv) an adjustment means that selectively applies a high voltage being obtained from the generator to one or more discharge means is provided, and (b) the effective and cosmetically active substance is electrostatically sprayed on the desired part of the body from the one or more discharge means by operating said adjustment means.

[0012]

A second invention provides a device for discharging an effective and cosmetically active substance to the body, and said device includes (a) a storage unit that contains an effective and cosmetically active substance in electrostatically sprayable form, (b) at least one discharge means connected to said storage unit, (c) a high voltage generator having a mechanical power source, and (d) an adjustment means that selectively applies a high voltage obtained from the



generator to one or more discharge means and electrostatically sprays the effective and cosmetically active substance discharged from the one or more discharge means.

[0013]

A third invention provides a combination consisting of the device defined in the above-mentioned inventions and an electrostatically sprayable composition composed of one or more effective and cosmetically active substances or essentially one or more effective and cosmetically active substances or contains one or more effective and cosmetically active substances.

[0014]

The effective and cosmetically active substances of the above-mentioned first to third inventions are especially preferably pure or essentially pure.

[0015]

The main characteristics of the present invention have been explained. Next, its preferred embodiment and various desirable characteristics are explained with reference to the attached figure. Also, Figure 1 is a basic diagram showing a preferred embodiment of the device of the present invention.

[0016]

A first advantage of the discharge system of the present invention is that an effective and cosmetically active substance is discharged in a pure or essentially pure form to the body. In other words, only the effective and cosmetically active substance is contained, or one kind or more additives such as substances required for preparing electrostatic spray parameters of a solvent or composition are included at a small amount. If the effective and cosmetically active substance is not pure, additives are included in a range of less than 10 wt%, more preferably less than 5 wt%, and especially preferably less than 1 wt%.

[0017]

Since the effective and cosmetically active substance that can be sprayed according to the present invention is preferably highly concentrated, the composition to be discharged can be discharged at a very low flow rate, and for example, the composition can be discharged at a flow rate of the corresponding magnitude smaller than the magnitude of the degree of dilution due to the solvent of the conventional composition such as the perfume spray seen in the prior art. An appropriate preferable flow rate in the present invention is further explained below.

[0018]

The effective and cosmetically active substance used in the present invention is especially preferably a perfume substance such as a perfume oil. However, the present invention can also be applied to other cosmetically active substances that have similar effects and are usually discharged at a very small amount. As the other effective and cosmetically active substances usable in the present invention, local therapeutic substances (for example, ethyl lactate and benzoyl peroxide), spot treating agents (for example, freckle treating agent), wart removers, skin adjustors (for example, perfluoropolyethers), and their mixtures are mentioned.

[0019]

As examples of the perfume substance such as essential oils and aromatic chemicals that can be discharged by the present invention, amber grease, clove, jasmine, lavender [transliteration], melilot, musk, myrrh, mastic, white sandalwood, benzyl acetate, benzyl salicylate, citronellol, coumarin, geraniol, linalool, linalyl acetate, musk ambrette, terpine acetate, etc., are mentioned.

[0020]

The above-mentioned effective and cosmetically active substances can be discharged alone or in combination according to the present invention.

[0021]

If necessary or if desired, the effective and cosmetically active substance to be discharged can be provided in a compositional form that dissolves the active substance or is dissolved in the active substance or includes one or more solvents or diluents compatible with the active substance. Such a solvent or diluent is preferably present at a small amount. As such a solvent or diluent, generally known substances such as alcohols and certain kind of esters are mentioned. As examples of appropriate solvents or diluents, ethanol, isopropyl alcohol, propylene glycol, dipropylene glycol, phenylethyl alcohol, glycerol, 1,3-butanediol, 1,2-propanediol, isoprene glycol, diethyl phthalate, etc., are mentioned.

[0022]

In general, there are essential requirements of an effective and cosmetically active substance, which is useful in the present invention and can be electrostatically sprayed, and a composition containing the substance.

[0023]

Usually, if necessary (further explained below), a first characteristic of the electrostatically sprayed substance or composition, which must be carefully selected or adjusted, is its resistivity. The resistivity is preferably about  $10^4$ - $10^{12}$  ohm·cm, more preferably about  $10^5$ - $10^{10}$  ohm·cm. A resistivity may also be less than  $10^4$ . The resistivity may also be greater than about  $10^{12}$  (for example, up to about  $10^{14}$  or higher). However, such a value is difficult to measure using a conventional inexpensive resistance meter. The resistivity is usually measured at 25°C using a standard conventional device and method.

[0024]

Therefore, according to the present invention, the effective and cosmetically active substance or composition containing the substance may also include one or more resistivity adjusting substances, if desired. The appropriate amount for the system can be easily measured by a simple experiment, though it depends on the kind of active substance being used and may also depend on other spray parameters. Preferably, the resistivity of a certain cosmetically active substance is lowered using a polar substance such as an alcohol (for example, ethanol), and the resistivity is raised using a nonpolar substance (for example, oil and other hydrophobic substances). As the other resistivity adjusting substances, charged substances such as salts (for example, sodium chloride or salts being used in personal products or buffer agents of drug compositions) are mentioned.

[0025]

In addition to the resistivity, the other parameter of the substance or composition to be sprayed that must be carefully selected or adjusted is the viscosity.

[0026]

The viscosity of the effective and cosmetically active substance or composition containing the substance suitable for the use of the present invention can be employed in a wide range, and the viscosity is preferably about 0.1-50,000 mPas, more preferably about 0.1-10,000 mPas, and especially preferably about 0.5-5000 mPas (25°C). If desired or if necessary, one or more viscosity adjustors may also be included. As examples of the viscosity adjustor, salts (for example, alkali metal or ammonium halides), polymers of an ordinary tackifier, and oil and polar oily tackifiers (cosmetic oil, wax, glyceride, and appropriate amphiphiles with melting points higher than 20°C, for instance) are mentioned.

[0027]

In actuality, since it is understood that the viscosity is essentially inversely related to the flow rate of the substance or composition being discharged from the discharge means, it can be used as a parameter for adjusting the discharge rate of the cosmetically active substance to a desired part. For example, an optimum discharge rate can be designated in accordance with the characteristics of the effective and cosmetically active substance or the habits or demands of the user. In this case, an automatic spreading adjustment mechanism can be obtained by carefully determining the viscosity of the substance or composition.

[0028]

In the present invention, any hardware and electrical constitutional elements and circuits may be adopted as long as they have appropriate constitutions and designs. Among the conventional electrostatic sprayers, there are many appropriate devices usable in the present invention, and such a device or its specific properties can be used alone or in combination with the spray system of the present invention.

[0029]

As examples of the appropriate electrostatic spray hardware, GB-A-2061769, GB-A-2073052, EP-A-031649, EP-A-132062, EP-A-163390, EP-A-132062, EP-A-163390, EP-A-171184, EP-A-171184, EP-A-234842, EP-A-243031, EP-A-368494, EP-A-441501, EP-A-468735, and EP-A-468736 are mentioned in addition to the above-mentioned references, and their contents are attached as references to this specification.

[0030]

In the present invention, as can be understood by those skilled in the art, the specific constitution and design and the electric and other operation parameters of such a device can be selected or adjusted as needed in accordance with the composition or substance to be sprayed and/or desired operation characteristics being designated by the demands of the user.

[0031]

As the characteristics of the device of the present invention that can be selected and/or adjusted, for example, the voltage obtained by the high-voltage generator and the power source, the size of the electric field of the discharge means of the substance or its area, the flow rate of the substance to be sprayed up to the discharge means or outside from the storage unit, the size and shape of the discharge means itself, and the constitution and properties of the substance

supply mechanism used between the storage unit and the outlet of the discharge means are mentioned.

[0032]

In a preferred embodiment of the present invention, the voltage generated by the high-voltage generator from the power source is preferably in the range of about 2-12 kV, more preferably about 5-10 kV, and specifically preferably about 6-8 kV. The voltage most suitable for a certain prescribed system depends on the substance to be sprayed and other parameters, all of which are generally selected so that the system is optimized.

[0033]

The magnitude of the electric field being the basis of the spray action of the electrostatic device depends considerably on the voltage being applied. However, the size of the electric field, if necessary, can be adjusted by changing the shape of the nozzle and/or using an electric field reinforcing electrode, for instance. Their adjusting method is well known from the above-mentioned cited references.

[0034]

The optimum flow rate of the substance to be sprayed frequently depends on the composition of the substance itself, especially the concentration of active component applied. Also, as already mentioned in relation to the viscosity of the substance that can be sprayed, the appropriate flow rate can be selected in accordance with the characteristics of the effective and cosmetically active substance or the habits or demands of the user. For example, the flow rate of the composition for the discharge of the embodiment of the present invention is in the range of preferably about 0.00001-0.01 mL/sec, more preferably about 0.0001-0.001 mL/sec. This flow rate is generally adopted for the case where one substance discharge means is employed. In an embodiment of the device of the present invention in which several discharge means are used, it is more appropriate to select the flow rate based on the total flow rate of all discharge means, and in this case, the optimum flow rate for one discharge means is relatively lower than the above-mentioned preferable value.

[0035]

The size and shape of one or more discharge means of the device of the present invention may be selected as appropriate, and in this case, the size and shape can be selected along with other parameters so that the electrostatic spray discharge system may function optimally. In general, the one or more discharge means are of the nozzle type and preferably composed of an

insulating substance or semi-insulating substance such as plastic or various polymers. This is well known in the corresponding technical field.

[0036]

Due to several advantages of the present invention, that is, since the spray is static and has a very low flow rate without bothering the eyes and since the cosmetically active substance related to the present invention is an effective and active substance such as a perfume, an excessive dose of the effective and cosmetically active substance is avoided by installing a means for adjusting the dose. Preferably, such a dose adjustment means includes a means for operating the sprayer for a preset time. Instead or furthermore, the dose adjustment means includes a means for discharging a preset amount of substance from the one or more discharge means, so that the spray discharge time can be adjusted, or without the adjustment, a fixed dose mechanism can also be included. For the above-mentioned purpose, an appropriate adjusting circuit mechanism including an electronic timer and a switch may also be installed in the device, and it may also be a well-known appropriate metering means for supplying a preset fixed amount of substance to the discharge means or each discharge means from the storage unit.

[0037]

In a preferred embodiment of the device of the present invention, the one or more discharge means are connected to one or more storage units (for example, in the case of the desire to spray more than one substance or compositions from the same device or the same discharge means) by a supply means for a substance, preferably a fluid. As sufficiently described in the prior references, such a supply means may also include a wick (for example, a porous wick), and the substance to be sprayed flows in it and/or on it, arrives at a high electric field strength, and is dispersed as a spray of charged small drops or particles. Also, the supply means may include a hollow conduit, through which the composition may pass by capillary action.

[0038]

As is well known, it is preferable for the device of the present invention to include a trigger (that is, a manual adjustment means) or an automatic adjustment means for selectively applying a high voltage obtained from the generator to the one or more discharge means to electrostatically spray a pure or essentially pure cosmetically active substance to a desired part of the body. However, as can be understood by those skilled in the art, for example, other appropriate adjustment means for automatically adjusting the operation of the system may also be used.

[0039]

Next, a preferred embodiment of the present invention is explained with reference to the attached Figure 1.

[0040]

As shown in the figure, the electrostatic sprayer includes a case 2 made of an insulating material (for example, plastic molded body), and various hardware elements of the system are included in the case, so that the device is convenient for handling and use, simple, light weight, and handy.

[0041]

The case 2 is equipped with various elements of the electrostatic spray system, and as the main elements, power source 12, high-voltage generator 14, additional circuit mechanisms 16a and 16b, operation adjustment means 20, storage unit 4, substance 6 to be sprayed, and discharge means 8 are contained, and a substance 6 is sprayed from an tip 9 of the discharge means 8. Next, each of these elements is explained in further detail.

[0042]

The power source 12 is a low-voltage battery such as a conventional 1.5-V battery used in small electronic devices such as electronic calculators and clocks. The high-voltage generator 14 is a converter that converts a low voltage AC generated by the additional circuit mechanism 16a to a high voltage AC, and the high voltage AC is sent to the upper elements of the electrostatic sprayer by the additional circuit mechanism 16. The latter additional circuit mechanism especially contains a capacitor and a diode for converting the high voltage AC from the converter 14 into a high voltage DC.

[0043]

The upper elements of the electrostatic sprayer are the storage unit 4 containing the substance 6 to be sprayed and the substance discharge means 8. With the adoption of an electric contact means 5, the substance 6 can be raised to a high potential that is generated by the high voltage DC being generated by an electric component of the device. As a preferred embodiment, the substance 6 is a pure or essentially pure perfume oil, and it has already been established that it is discharged by a solution of an alcohol solvent in a conventional perfume spray, for instance. As already mentioned, one or more resistivity and/or viscosity adjustors may also be contained in the substance 6 to be sprayed in accordance with the characteristics of the perfume oil.

[0044]

The discharge means 8 of the illustrated embodiment is a wick of a porous substance (for example, a porous polymer substance), and the substance 6 is pulled up to its tip 9 by capillary action through the bottom. Since the tip 9 has a strong electric field, for example, the substance which is initially a thin stream and is eventually changed to a spray of small charged drops can be sprayed from the tip. The small charged drops seek for closest grounded object to discharge their electric charges. During use, preferably, the grounded target is a part of the body, for example, the skin, and the effective and cosmetically active substance is discharged on it.

[0045]

As another preferred embodiment of the device, the tip 9 of the discharge means 8 is a crown-shaped nozzle type, the discharge means 8 is preferably a fine conduit, and the substance is passed through it and pulled up to the nozzle by the capillary action. This is presented in EP-A-0243031. In this structure, since the electric field of several protruded parts of the nozzle is sufficiently larger than that of the remaining tip of the nozzle, the substance can be electrostatically jetted from the tip of the discharge element 8 in each of several protruding parts on the nozzle.

[0046]

The device shown in the figure further includes a microswitch 20. It constitutes an adjustment means for operating the device by applying a high voltage from the electric circuit to the discharge means through the operation of the switch. The position of the microswitch 20 in the device is preferably selected so that a user can easily operate it (for example, the position where it can be immediately used with a finger when the device is directed to a desired part of the body by the hand).

#### Brief description of the figure

Figure 1 is a basic diagram showing a preferred embodiment of the device of the present invention

Explanation of reference symbols:

- 2 Case
- 4 Storage unit
- 5 Electric contact means
- 8 Discharge means
- 12 Power source



- 14 High-voltage generator
- 16a Additional circuit mechanism
- 16b Additional circuit mechanism
- 20 Microswitch

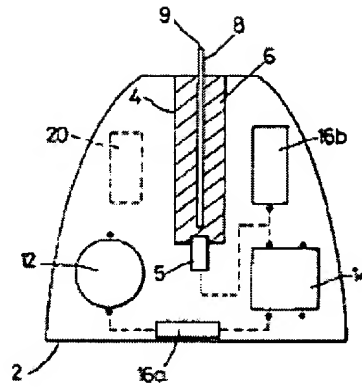


Fig. 1